

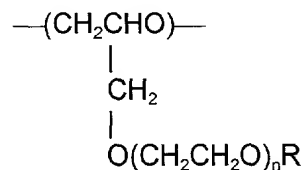
What Is Claimed Is:

1. A polymeric gel electrolyte prepared by a process comprising:  
preparing a solution by dissolving a terpolymer having a repeating unit represented by formula 1, a repeating unit represented by formula 2 and a repeating unit represented by formula 3 in a first organic solvent having a boiling point of 150°C or less,

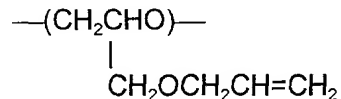
Formula 1



Formula 2



Formula 3



wherein  $n$  is an integer from 1 to 12 and  $R$  is an alkyl having 1 to 12 carbon atoms,  
mixing a lithium salt and a second organic solvent with the solution to obtain a composition for forming an electrolyte, and  
removing the first organic solvent from the composition for forming an electrolyte .

2. The polymeric gel electrolyte according to claim 1, wherein the first organic solvent has a boiling point in the range of 50°C to 100°C.
3. The polymeric gel electrolyte according to claim 1, wherein the first and second organic solvents are different organic solvents.
4. The polymeric gel electrolyte according to claim 1, wherein the terpolymer

contains

- 0.1 to 0.9 mol of the repeating unit represented by formula 1,
- 0.1 to 0.8 mol of the repeating unit represented by formula 2, and
- 0.01 to 0.8 mol of the repeating unit represented by formula 3.

5. The polymeric gel electrolyte according to claim 1, wherein the weight average molecular weight of the terpolymer is 10,000 to 2,000,000.

6. The polymeric gel electrolyte according to claim 1, wherein the ratio of the weight of the terpolymer to the total weight of the lithium salt and the second organic solvent is in the range of from 1:1 to 1:50.

7. The polymeric gel electrolyte according to claim 1, wherein  
the lithium salt is at least one salt selected from the group consisting of lithium perchlorate ( $\text{LiClO}_4$ ), lithium tetrafluoroborate ( $\text{LiBF}_4$ ), lithium hexafluorophosphate ( $\text{LiPF}_6$ ), lithium trifluoromethanesulfonate ( $\text{LiCF}_3\text{SO}_3$ ) and lithium bistrifluoromethanesulfonyl amide ( $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ ), and

the second organic solvent is at least one solvent selected from the group consisting of propylene carbonate (PC), ethylene carbonate (EC), dimethyl carbonate (DMC), methylethyl carbonate (MEC), diethyl carbonate (DEC) and vinylene carbonate (VC).

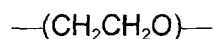
8. The polymeric gel electrolyte according to claim 1, wherein the first organic solvent is acetone or tetrahydrofuran.

9. A lithium battery comprising:  
an electrode assembly having a cathode, an anode and a separator interposed between the cathode and the anode,  
a polymeric gel electrolyte prepared by a process comprising:  
preparing a solution by dissolving a terpolymer having a repeating unit represented by formula 1, a repeating unit represented by formula 2 and a repeating unit represented by formula 3 in a first organic solvent having a boiling point of 150°C or

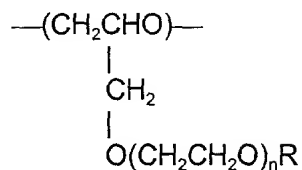
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less,

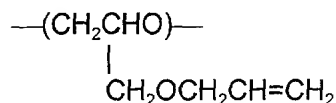
Formula 1



Formula 2



Formula 3



wherein n is an integer from 1 to 12 and R is an alkyl having 1 to 12 carbon atoms,

mixing a lithium salt and a second organic solvent with the solution to obtain a composition for forming an electrolyte,

sandwiching the polymeric gel electrolyte and the separator between the cathode and the anode to form a sandwiched structure, and  
removing the first organic solvent from the sandwiched structure.

10. The lithium battery according to claim 9, wherein the polymeric gel electrolyte is present between the separator and the cathode and between the separator and the anode.

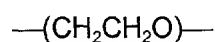
11. The method according to claim 9, wherein the first and second organic solvents are different organic solvents.

12. The method according to claim 9, wherein the boiling point of the first organic solvent is in the range of 50°C to 100°C.

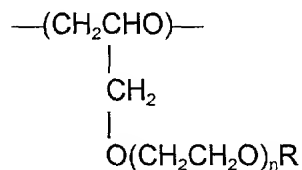
13. The lithium battery according to claim 9, wherein the terpolymer contains  
0.1 to 0.9 mol of the repeating unit represented by formula 1,  
0.1 to 0.8 mol of the repeating unit represented by formula 2, and  
0.01 to 0.8 mol of the repeating unit represented by formula 3.
14. The lithium battery according to claim 9, wherein the weight average molecular weight of the terpolymer is 10,000 to 2,000,000.
15. The lithium battery according to claim 9, wherein the ratio of the weight of the terpolymer to the total weight of the lithium salt and second organic solvent is in the range from 1:1 to 1:50.
16. The lithium battery according to claim 9, wherein  
the lithium salt is at least one salt selected from the group consisting of lithium perchlorate ( $\text{LiClO}_4$ ), lithium tetrafluoroborate ( $\text{LiBF}_4$ ), lithium hexafluorophosphate ( $\text{LiPF}_6$ ), lithium trifluoromethanesulfonate ( $\text{LiCF}_3\text{SO}_3$ ) and lithium bistrifluoromethanesulfonyl amide ( $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ ), and  
the second organic solvent is at least one solvent selected from the group consisting of propylene carbonate (PC), ethylene carbonate (EC), dimethyl carbonate (DMC), methylethyl carbonate (MEC), diethyl carbonate (DEC) and vinylene carbonate (VC).
17. The lithium battery according to claim 9, wherein the first organic solvent is acetone or tetrahydrofuran.
18. The lithium battery according to claim 9, wherein the electrode assembly is a winding assembly electrode assembly, and the case accommodating the electrode assembly is a pouch.
19. The lithium battery according to claim 9, wherein the separator is formed of an insulating resin sheet and the insulating resin sheet is made of polyethylene, polypropylene or a combination thereof.

20. A method of manufacturing a lithium battery comprising:  
obtaining a composition for forming an electrolyte by a process comprising:  
preparing a solution by dissolving a terpolymer having a repeating unit represented by formula 1, a repeating unit represented by formula 2 and a repeating unit represented by formula 3 in a first organic solvent having a boiling point of 150°C or less, and

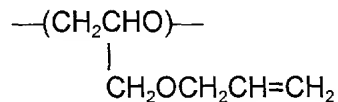
Formula 1



Formula 2



Formula 3



wherein n is an integer from 1 to 12 and R is an alkyl having 1 to 12 carbon atoms,  
mixing a lithium salt and a second organic solvent with the solution;  
forming a sandwich structure by sandwiching a separator and the composition for forming an electrolyte between a cathode and an anode ; and  
removing the first organic solvent from the sandwich structure .

21. The method of claim 20, wherein the composition for forming an electrolyte is formed between the anode and the separator and between the cathode and the separator.

22. The method of according to claim 20, wherein the sandwich structure is formed by:  
inserting the cathode, the anode and the separator into a case, and

injecting the composition for forming an electrolyte into the case.

23. The method according to claim 22, further comprising hermetically sealing the case after removing the first organic solvent from the sandwich structure.

24. The method according to claim 18, wherein the sandwich structure is formed by coating the composition for forming an electrolyte on at least one of the cathode, the anode and the separator.

25. The method according to claim 20, wherein the first and second organic solvents are different organic solvents.

26. The method according to claim 20, wherein the boiling point of the first organic solvent is in the range of 50°C to 100°C.

27. The method according to claim 20, wherein the terpolymer contains  
0.1 to 0.9 mol of the repeating unit represented by formula 1,  
0.1 to 0.8 mol of the repeating unit represented by formula 2, and  
0.01 to 0.8 mol of the repeating unit represented by formula 3.

28. The method according to claim 20, wherein the weight average molecular weight of the terpolymer is 10,000 to 2,000,000.

29. The method according to claim 20, wherein the ratio of the weight of the terpolymer to the total weight of the lithium salt and the second organic solvent is in the range of from 1:1 to 1:50.

30. The method according to claim 20, wherein the  
lithium salt is at least one salt selected from the group consisting of lithium perchlorate ( $\text{LiClO}_4$ ), lithium tetrafluoroborate ( $\text{LiBF}_4$ ), lithium hexafluorophosphate ( $\text{LiPF}_6$ ), lithium trifluoromethanesulfonate ( $\text{LiCF}_3\text{SO}_3$ ) and lithium bistrifluoromethanesulfonyl amide

( $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ ), and

the second organic solvent is at least one solvent selected from the group consisting of propylene carbonate (PC), ethylene carbonate (EC), dimethyl carbonate (DMC), methylethyl carbonate (MEC), diethyl carbonate (DEC) and vinylene carbonate (VC).

31. The method according to claim 20, wherein the first organic solvent is acetone or tetrahydrofuran.

32. The method according to claim 20, wherein the separator is formed of an insulating resin sheet formed of polyethylene, polypropylene or a combination thereof.

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